

IN THE CLAIMS:

The listing of claims replaces all prior versions, and listings, of claims in the application.

1. (Currently amended) An apparatus comprising:
an intravascular device to perform a therapeutic treatment; and
~~at least one sheathed optical fiber disposed through the intravascular device,~~
at least one optical fiber disposed within a sheath and disposed within the intravascular device, the at least one optical fiber also disposed within an enclosure that is bonded to at least one point along the sheath, the optical fiber configured to provide diagnostic information before and after the therapeutic treatment.
2. (Original) The apparatus of claim 1 wherein the optical fiber is exposed within a vasculature of a patient at least at one location along the intravascular device.
3. (Original) The apparatus of claim 2 wherein the optical fiber is configured to sense vessel and blood characteristics.
4. (Original) The apparatus of claim 3 wherein vessel and blood characteristics are selected from the group consisting of hemodynamic characteristics, hematological parameters related to blood and blood components and thermal parameters of the vasculature.
5. (Original) The apparatus of claim 1 wherein the intravascular device is a balloon catheter comprising:
a catheter shaft having an elongated outer member disposed about a tubular inner member, the tubular inner member having a lumen to receive the optical fiber therethrough;
and
a balloon coupled to a distal portion of the catheter shaft.
6. (Canceled)

7. (Original) The apparatus of claim 5 wherein the optical fiber is movable within the lumen.
8. (Original) The apparatus of claim 5 wherein the lumen is to receive an inflation medium therethrough to inflate the balloon.
9. (Original) The apparatus of claim 8 wherein a distal tip of the optical fiber is exposed within a vasculature of a patient at least at one location along the balloon catheter.
10. (Original) The apparatus of claim 9 wherein the optical fiber is configured to sense vessel and blood characteristics selected from the group consisting of hemodynamic characteristics, hematological parameters related to blood and blood components and thermal parameters of the vasculature.
11. (Original) The apparatus of claim 5 wherein the tubular inner member has a second lumen extending at least within a distal portion of the tubular inner member, the second lumen being substantially parallel to the lumen having the optical fiber therethrough.
12. (Original) The apparatus of claim 11 wherein the second lumen is a lumen selected from the group consisting of guidewire lumen, inflation lumen, radiation source lumen, drug delivery lumen, atherectomy device lumen and laparoscopy lumen.
13. (Original) The apparatus of claim 12 wherein a distal tip of the optical fiber is exposed within a vasculature of a patient at least at one location along the balloon catheter.
14. (Original) The apparatus of claim 13 wherein the optical fiber is configured to sense vessel and blood characteristics selected from the group consisting of hemodynamic characteristics, hematological parameters related to blood and blood components and thermal parameters of the vasculature.

15. (Currently amended) A catheter comprising:
a catheter shaft having an elongated outer member disposed about an tubular inner member and an intraluminal gap extending longitudinally between the outer member and the inner member; and
~~at least one sheathed optical fiber disposed within the intraluminal gap,~~ at least one optical fiber disposed within a sheath and disposed within the intraluminal gap, the at least one optical fiber also disposed within an enclosure that is bonded to at least one point along the inner member, the catheter capable of both diagnostic and therapeutic purposes.
16. (Original) The catheter of claim 15 further comprises an inflatable balloon coupled to the catheter shaft.
17. (Original) The catheter of claim 16 further comprises at least one lumen longitudinally extending through the tubular inner member.
18. (Original) The catheter of claim 17 wherein the at least one lumen is selected from the group consisting of guidewire lumen, inflation lumen, radiation source lumen, drug delivery lumen, atherectomy device lumen and laparoscopy lumen.
19. (Original) The catheter of claim 15 wherein a distal tip of the optical fiber to contact a vasculature of a patient at least at one location along the catheter.
20. (Original) The catheter of claim 19 wherein the at least one optical fiber is configured to sense vessel and blood characteristics selected from the group consisting of hemodynamic characteristics, hematological parameters related to blood and blood components and thermal parameters of the vasculature.
21. (Original) The catheter of claim 15 wherein a distal portion of the at least one optical fiber comprises a radiopaque substance.
22. – 25. (Canceled)

26. (Currently amended) An apparatus comprising:
a catheter comprising a catheter shaft having a lumen therein;
a sheath slidably disposed over the catheter shaft; the catheter shaft and the sheath defining an intraluminal gap extending longitudinally therebetween; and
~~at least one optical fiber disposed within the intraluminal gap, at least one optical fiber disposed within the intraluminal gap, the at least one optical fiber also disposed within an enclosure that is bonded to at least one point along the sheath,~~ the apparatus capable of both diagnostic and therapeutic purposes.

27. (Original) The apparatus of claim 26 wherein a distal tip of the optical fiber to contact a vasculature of a patient at least at one location along the sheath, the optical fiber configured to sense vessel and blood characteristics selected from the group consisting of hemodynamic characteristics, hematological parameters related to blood and blood components and thermal parameters of the vasculature.

28. – 31. (Canceled)

32. (Currently amended) A system for sensing vessel and blood characteristics, the system comprising:
a data processing system; and
an apparatus coupled to the data processing system, the apparatus comprising an intravascular device to perform a therapeutic treatment and ~~at least one sheathed optical fiber disposed therethrough,~~ at least one optical fiber disposed within a sheath and disposed within the intravascular device, the at least one optical fiber also disposed within an enclosure that is bonded to at least one point along the sheath, the optical fiber configured to provide diagnostic information before and after the therapeutic treatment.

33. (Original) The system of claim 32 wherein a distal tip of the optical fiber to contact a vasculature of a patient at least at one location along the intravascular device, the optical fiber configured to sense vessel and blood characteristics selected from the group consisting of hemodynamic characteristics, hematological parameters related to blood and blood components and thermal parameters of the vasculature.

34. (Currently amended) A method of sensing vessel and blood characteristics, the method comprising:

inserting an apparatus into a vasculature of a patient, the apparatus comprising a ~~sheathed intravascular~~ an intravascular device to perform a therapeutic treatment and ~~at least one optical fiber disposed within the intravascular device,~~ at least one optical fiber disposed within a sheath and disposed within the intravascular device, the at least one optical fiber also disposed within an enclosure that is bonded to at least one point along the sheath, the optical fiber to transmit a light radiation signal therethrough;

advancing the apparatus to a location in the vasculature;

operating a data processing system coupled to the apparatus to transmit a plurality of light radiation signals to the location in the vasculature and a plurality of reflected light radiation signals to a detector in the data processing system; and

processing the plurality of reflected light radiation signals to determine vessel and blood characteristics.

35. (Original) The method of claim 34 wherein vessel and blood characteristics are selected from the group consisting of hemodynamic characteristics, hematological parameters related to blood and blood components and thermal parameters of the vasculature.

36. – 43. (Canceled)

44. (Currently amended) A catheter, comprising:

a catheter inner shaft member having a first lumen adapted to receive an optical fiber sensor, the optical fiber disposed within an enclosure that is bonded to at least one point along an interior surface of a wall that forms the first lumen, a second lumen adapted to receive a guidewire, and a third lumen adapted to received a therapeutic drug, wherein the optical fiber is configured to provide diagnostic information before and after a therapeutic treatment.

45. (Original) The catheter of claim 44, wherein a tapered mandrel is disposed near a distal end of the first lumen to provide support to the catheter inner shaft member.

46. (Original) The catheter of claim 44, further comprising an inflatable balloon coupled to the catheter inner shaft member, and wherein the third lumen is also adapted to receive an inflation medium.

47. (Canceled)